[INCH-POUND]
A-A-50586
June 15, 1997
SUPERSEDING
MIL-P-28501C(YD)

# COMMERCIAL ITEM DESCRIPTION

## PUMP ASSEMBLIES, DEEP-WELL, ELECTRIC-MOTOR-DRIVEN

The General Services Administration has authorized the use of this commercial item description for all Federal agencies.

1. SCOPE. This commercial item description (CID) covers two sizes of electric-motor-driven, deep-well, centrifugal, submersible pump assemblies. The pump assemblies will be used for semi-permanent and permanent 6-inch (152 millimetre (mm)) diameter, deep-well, water supply systems.

2. CLASSIFICATION. The pump assemblies are of the following sizes, as specified (see 7.2):

Sizes

Size 1 - 26 gallons per minute (gpm) (1.64 litre per second (L/s)) at 500 feet (152 400 mm) total dynamic head.
Size 2 - 159 gpm (10.02 L/s) at 500 feet (152 400 mm) total dynamic head.

3. SALIENT CHARACTERISTICS.

3.1 Description. The pump assembly shall consist essentially of a vertical multistage turbine pumping element, a submersible cable, a submersible electric motor, and all necessary accessories and connectors required for a complete deep-well submersible pump. The CID does not require that column piping or well casing be furnished with the pump assembly.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 1581), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

3.1.1 Performance requirements. All performance requirement testing shall be conducted in accordance with the Centrifugal Pump section of the Hydraulic Institute Standards.

3.2 Standard commercial product. The pump assembly shall, as a minimum, be in accordance with the requirements of this commercial item description and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this commercial item description but which are a part of the manufacturer's standard commercial product, shall be included in the pump assembly being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market, through advertisements or manufacturer's catalogs, or brochures, and represent the latest production model.

3.3 Design and construction. The size 1 pump assembly shall be designed to deliver not less than 26 gpm (1.64 L/s) of water against a total dynamic head of 500 feet (152 400 mm). The size 2 pump assembly shall be designed to deliver not less than 159 gpm (10.02 L/s) of water against a total dynamic head of 500 feet (152 400 mm). Both size pump assemblies shall be designed and constructed to withstand the strains, jars, vibrations, and other conditions associated with shipping, storage, and installation; and shall be complete so that when installed, it can be used for its intended purpose. The pump assembly and accessories shall be designed and constructed to prevent conditions hazardous to personnel or deleterious to equipment. The pump assembly and accessories shall withstand the hard usage encountered in military service or shore establishments. The pump assembly and accessories shall permit easy and ready accessibility for replacement of accessories, maintenance, service, and adjustments in the field. All threaded parts shall conform to ASME B 1.1, ASME B 1.20.1, and ASME B 1.20.3, as applicable.

3.3.1 Pumping element, size 1. The size 1 pumping element shall be of the vertical turbine type, consisting of an impeller shaft, a corrosion-resistant intake screen, and a series of individual turbine bowls threaded or bolted together. In lieu of turbine bowl, the pumping elements may include a series of plastic impellers and diffusers housed in a stainless steel or brass casing. The bowls shall be bronze, stainless steel, or close-grained cast iron having smooth-finish surfaces and liquid passages, and shall be designed for use in 6-inch (152 mm) well casings. A bronze, stainless steel, or rubber bearing, or combination of rubber and bronze or stainless steel, protected by seal and sand collars where applicable, shall be provided at each end of the pumping element. The impeller shaft shall be of turned, ground, stainless steel with not less than 12 percent chromium content. The discharge connection and pump shall be designed to withstand a hydrostatic pressure equal to 1.5 times the pump discharge pressure or the total dynamic head, whichever is greater. Upthrust protection shall be provided in the bowl assembly.

3.3.2 Pumping element, size 2. The size 2 pumping element shall be of the vertical turbine type consisting of an impeller shaft, a stainless steel intake screen, and a series of individual turbine type bowls threaded or bolted together. The bowls shall be bronze or close-grained cast iron having smooth-finish interior surfaces and liquid passages, and shall be designed for use in 6-inch (152 mm) well casing. Impellers shall be statically balanced and securely fastened to the shaft. A bronze bearing, a rubber bearing, or a combination of the two shall be provided in each bowl stage for each impeller. A main bronze bearing, protected by seals and sand collars, when

applicable, shall be provided at each end of the pumping element. The impeller shaft shall be turned, ground, stainless steel with not less than 12 percent chromium content. The discharge connection and pump to motor adapter shall be cast or ductile iron. The pump shall be designed to withstand hydrostatic pressure equal to 1.5 times the pump discharge pressure or the total dynamic head, whichever is greater. Upthrust protection shall be provided in the bowl assembly.

3.3.3 Shaft coupling. A stainless steel splined or keyed coupling shall connect the pump assembly to the motor to provide a direct drive to the pump.

3.3.4 Surface plate. A 6-inch (152 mm) by 1.5-inch (38.1 mm) surface plate shall be furnished with each size 1 pump assembly. Each size 2 pump assembly shall be furnished with a 6-inch (152 mm) by 3-inch (76.2 mm) surface plate. The surface plate shall be provided with well and cable seals. The seals shall have auxiliary openings of proper size to fit the cable. Discharge flange shall be flanged and rated for the maximum system pressure.

3.4 Electric requirements.

3.4.1 Motors. Electric motors shall conform to NEMA MG 1. The motor shall be of the submersible type, equipped with heavy-duty thrust bearing rated to operate continuously at a thrust load equal to 90 percent of the maximum thrust that the pump can impose under any head condition. Size 1 and 2 pump electric motors shall have a nameplate rating of 200 volts, alternating current (Vac), 3-phase, 60 Hertz, for operation on a 208 Vac supply. Size 1 pump electric motor shall be not less than 5 hp (3.73 kilowatts (kW)). The hp for size 2 pump motor shall be not less than 30 hp (22.4 kW) and shall be designed for low voltage starting.

3.4.2 Motor controller. Motor controller shall conform to NEMA ICS 1 and NEMA ICS 2. All units shall be equipped with hand off-auto selector switch suitability enclosed. The starter shall be equipped with overload protection in all phases, low voltage motor protection, and shall be furnished with an enclosure in accordance with NEMA ICS 6. Size 1 units shall be equipped with an across-the-line magnetic starter. Size 2 units shall be equipped for low voltage starting. When specified (see 7.2), extra-quick trip ambient compensated overload relays shall be provided.

3.4.3 Cable. Unless otherwise specified (see 7.2), the electrical conductors shall conform to the applicable portions of NEMA WC 3, including the requirements for portable multiple-conductor power cables. All cables and cords shall be of round construction. The cable shall be designed for heavy-duty, hard usage, and shall be resistant to ozone, sunlight, oils and solvents, cracking, salt water, and physical abuse. The cable shall be designed to operate continuously at a cable temperature of 194 degrees Fahrenheit (°F) (90 degrees Celsius (°C)) in a 104 °F (40 °C) ambient temperature environment. The voltage rating of all insulated conductors in the cable shall be not less than 600 Vac. The cable for size 1 pump assembly shall have not less than No. 4 American Wire Gage (AWG) size conductors. The cable for size 2 pump assembly shall have not less than No. 2 AWG size conductors. All conductors including the grounding conductors shall be made of copper. The outer jacket shall be black in color. The cable shall conform to the applicable requirements of UL 62, type SO class 27 outer jacket, class 28 conductor insulation, and meet water-resistant requirements. Unless otherwise specified (see 7.2), the motor head cable shall be

provided with not less than 6 foot (1 829 mm) pigtail, No. 14 AWG for the size 1 pump assembly, and No. 10 AWG for the size 2 pump assembly for field connection. A corrosion-resistant cable guard shall be provided for the full length of the power cable.

3.5 Additional equipment.

3.5.1 Splice kit. A splice kit, containing all material necessary, including water sealant covers for attaching the submersible cable to the motor leads, shall be furnished with each pump assembly. The splice shall conform to UL 486C.

3.5.2 Check valve. A check valve with 1-1/2-inch (38 mm) American Standard Taper Pipe Thread (NPT) for general use shall be furnished with each size 1 pump assembly. If the check valve is an integral part of the pump discharge casing, the threads shall be 1-1/2-inch (38 mm) NPT female on both ends. A check valve with 3-inch (76.2 mm) NPT threads on both ends shall be furnished with each size 2 pump assembly.

3.6 Safety. All mechanical and electrical parts that are of such nature or so located as to become a hazard to operating or maintenance personnel shall be enclosed or properly guarded. The pump assembly shall comply with OSHA 29, CFR, Part 1910.95 for noise and Part 1910.219 for guarding.

3.7 Lubrication. Unless otherwise specified (see 7.2), means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be easily visible and accessible. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high-pressure lubricating equipment, 1,000 pounds per square inch gage (6 895 kilopascals) or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location.

3.8 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to ensure interchangeability of component parts, assemblies, accessories, and spare parts.

3.9 Identification plate. An identification plate will be furnished by the contracting officer for each pump assembly. The contractor shall stamp all necessary data in the blank spaces of the plate provided for that purpose, and securely affix a plate to each pump assembly in a conspicuous place with nonferrous screws, rivets, or bolts not less than 0.125-inch (3 mm) in diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank.

3.10 Instruction plate. The pump assembly shall be equipped with instruction plates suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates shall be of a material which will last and remain legible for the life of the equipment. Plates shall be securely affixed to the equipment with nonferrous screws or bolts of not less than 0.125-inch (3 mm) diameter.

3.11 Cleaning, treatment, and painting. Unless otherwise specified (see 7.2), the pump assembly shall be treated and painted in accordance with the manufacturer's standard practice. All surfaces of the pump assembly other than corrosion-resisting steel shall be protected against corrosion and present a neat appearance.

4. REGULATORY REQUIREMENTS.

4.1 Materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this commercial item description are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term “recovered materials” means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this commercial item description.

4.2 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of ASTM E 380, and all other requirements of this commercial item description including form, fit and function are met. If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this commercial item description, conform to the producer’s own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

6. PACKAGING. The preservation, packing, and marking shall be as specified in the contract or order.

7. NOTES.

7.1 Source of documents.

7.1.1 Copies of specifications and standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.

7.1.2 Occupational Safety and Health Administration (OSHA) documents may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

7.1.3 ASME Standards are available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

7.1.4 ASTM Standards are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

7.1.5 HI Standards are available from the Hydraulic Institute, 9 Sylvan Way, Parsippany, NJ 07054-3802.

7.1.6 NEMA Standards are available from the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rossyln, VA 22209.

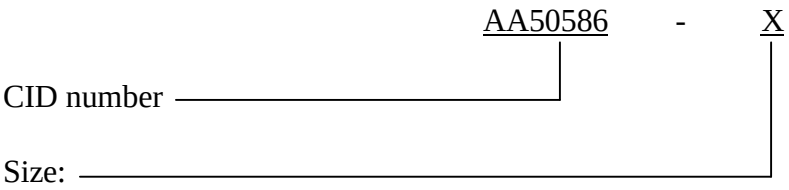
7.1.7 SAE Standards are available from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

7.1.8 UL Standards are available from the Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

7.2 Ordering data. Acquisition documents should specify the following:

a. Title, number and date of this commercial item description.
b. Size of pump assembly required (see 2.).
c. When extra-quick trip ambient overload relays are to be provided (see 3.4.2).
d. When electrical conductors are to conform to requirements other than as specified (see 3.4.3).
e. When cable and length are to be different (see 3.4.3).
f. When lubrication is to be different (see 3.7).
g. When treating and painting is other than as specified (see 3.11).

7.3 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PIN to be used for items acquired to this description are created as follows:




1 = Axially split, side suction
2 = Radially split, end suction

7.4 National Stock Numbers (NSNs). The following is a list of NSNs assigned which correspond to this commercial item description. The list may not be indicative of all possible NSNs associated with the commercial item description.

4320-00-089-3619 - Pump unit, centrifugal.
4320-00-089-3620 - Pump unit, centrifugal.

7.5 Subject term (key word) listing.

Centrifugal pump
Check valve
Multistage element
Splice kit
Submersible cables

MILITARY INTEREST:

Custodian:
Navy - YD1

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:
Navy - YD1

(Project 4320-0026)

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

| **I RECOMMEND A CHANGE:** | **1. DOCUMENT NUMBER** A-A-50586 | **2. DOCUMENT DATE (YYMMDD)** 970615 |
|---|---|---|

**3. DOCUMENT TITLE** PUMP ASSEMBLIES, DEEP-WELL, ELECTRIC-MOTOR DRIVEN

**5. REASON FOR RECOMMENDATION**

**6. SUBMITTER**

| a. NAME *(Last, First, Middle Initial)* | b. ORGANIZATION | |
|---|---|---|
| c. ADDRESS *(Include Zip Code)* | d. TELEPHONE (Include Area Code)<br>(1) Commercial<br>(2) AUTOVON *(if applicable)* | **7. DATE SUBMITTED** (YYMMDD) |

**8. PREPARING ACTIVITY**

| a. NAME<br>DWAYNE MILLS | b. TELEPHONE *Include Area Code)*<br>(1) Commercial (805) 982-9681<br>(2) AUTOVON 551-9681 |
|---|---|
| c. ADDRESS *(Include Zip Code)*<br>COMMANDING OFFICER, NCBC CODE 15E2M<br>10000 23RD AVENUE<br>PORT HUENEME, CA 93043-4301 | **IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:**<br>DEFENSE QUALITY AND STANDARDIZATION OFFICE<br>5203 Leesburg Pike, Suite 1403, Falls Church, VA 22401-3466<br>Telephone (703) 756-2340 AUTOVON 289-2340 |